Atlantic Richfield Company

Shannon Couch
Operations Project Manager

PO Box 1257
San Ramon, CA 94583
Phone: (925) 275-3804
Fax: (925) 275-3815
E-Mail: shannon.couch@bp.com

October 25, 2012

RECEIVED

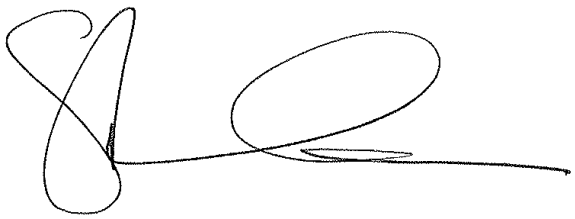
11:18 am, Nov 01, 2012

Alameda County
Environmental Health

Re: Third Quarter 2012 Monitoring Report
Former Richfield Oil Company Station #472
6415 International Boulevard, Oakland, California
ACEH Case #RO0002982

I declare that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct.

Submitted by,



Shannon Couch
Operations Project Manager

Attachment

BROADBENT
1324 Mangrove Ave., Suite 212, Chico, CA 95926
[T] 530-566-1400 [F] 530-566-1401
broadbentinc.com

October 25, 2012

Project No. 09-88-601

Atlantic Richfield Company
P.O. Box 1257
San Ramon, CA 94583
Submitted via ENFOS

Attn.: Ms. Shannon Couch

Re: Third Quarter 2012 Monitoring Report, Former Richfield Oil Company Station #472, 6415 International Boulevard, Oakland; ACEH Case #RO0002982

Dear Ms. Couch:

Attached is the Third Quarter 2012 Monitoring Report for the Former Richfield Oil Company Station #472 located at 6415 International Boulevard, Oakland, California. This report presents results of groundwater sampling recently conducted and a summary of current developments at the Site through the Third Quarter of 2012.

Should you have questions regarding the work performed or results obtained, please do not hesitate to contact me at 530-566-1400.

Sincerely,
BROADBENT & ASSOCIATES, INC.

Thomas A. Venus, PE
Senior Engineer

Enclosures

cc: Ms. Dilan Roe, P.E.,, Alameda County Environmental Health (submitted via ACEH ftp site)
Mr. Mahmud Ghanem, 6207 International Blvd, Oakland, California 94621
Electronic copy uploaded to GeoTracker

THIRD QUARTER 2012
MONITORING REPORT
FORMER STATION #472, OAKLAND, CALIFORNIA

Broadbent & Associates, Inc. (Broadbent) is pleased to present this *Third Quarter 2012 Monitoring Report* on behalf of Atlantic Richfield Company (a BP affiliated company) for Former Richfield Oil Company Station #472 (also previously known as Pluckey's Liquors) located in Oakland, Alameda County, California. Quarterly reporting is being submitted to the Alameda County Environmental Health Services Agency (ACEH) consistent with their requirements under the legal authority of the California Regional Water Quality Control Board, as codified by the California Code of Regulations Title 23, Section 2652(d). Details of work performed, discussion of results, and recommendations are provided below.

Facility Name / Address:	Former Station #472 / 6415 International Boulevard, Oakland
Client Project Manager / Title:	Ms. Shannon Couch / RM Operations Project Manager
Broadbent Contact:	Mr. Tom Venus, PE / (530) 566-1400
Broadbent Project No.:	09-88-601
Primary Regulatory Agency / ID No.:	ACEH, Case #RO00002982 (GeoTracker ID #T10000000417)
Current phase of project:	Monitoring/Case Closure Petition
List of Acronyms / Abbreviations:	See end of report text for list of acronyms/abbreviations used in report.

WORK PERFORMED THIS QUARTER (Third Quarter 2012):

1. Submitted *Second Quarter 2012 Status Report* (Broadbent, 7/27/2012).
2. Conducted groundwater monitoring/sampling for Third Quarter 2012 on August 15, 2012.

WORK SCHEDULED FOR NEXT QUARTER (Fourth Quarter 2012):

1. Submit *Third Quarter 2012 Monitoring Report* (contained herein).
2. No environmental field work is presently scheduled at Former Station #472 during Fourth Quarter 2012.

ADDITIONAL WORK RECOMMENDED FOR NEXT QUARTER (Fourth Quarter 2012)

1. Submit revised UST Case Summary and Closure Request report.

GROUNDWATER MONITORING PLAN SUMMARY:

Groundwater level gauging:	MW-1 through MW-3	(1Q & 3Q)
Groundwater sample collection:	MW-1 through MW-3	(1Q & 3Q)
Biodegradation indicator parameter monitoring:	MW-1 through MW-3	(1Q & 3Q)

QUARTERLY RESULTS SUMMARY:

LNAPL

LNAPL observed this quarter:	No	(yes\no)
LNAPL recovered this quarter:	None	(gal)
Cumulative LNAPL recovered:	None	(gal)

Groundwater Elevation and Gradient:

Depth to groundwater:	8.79 (MW-2) to 10.45 (MW-3)	(ft below TOC)
Gradient direction:	South-Southwest	(compass direction)
Gradient magnitude:	0.011	(ft/ft)
Average change in elevation:	-1.13	(ft since last measurement)

Laboratory Analytical Data

Summary: DRO was detected in MW-1 at 220 µg/L and MW-3 at 600 µg/L; GRO was detected in MW-1 at 490 µg/L; other petroleum hydrocarbon constituents were not detected above the reporting limits. DRO increased in MW-1 and MW-3 relative to First Quarter 2012.

ACTIVITIES CONDUCTED & RESULTS:

Third Quarter 2012 groundwater monitoring was conducted on August 15, 2012 by Broadbent personnel in accordance with the monitoring plan summary detailed above. No irregularities were noted during water level gauging. Light, Non-Aqueous Phase Liquid (LNAPL, or free product) was not noted to be present in the wells monitored during this event. Depth to water measurements ranged from 8.79 ft at MW-2 to 10.45 ft at MW-3. Depths to water measurements were within the screened interval of each well. Resulting groundwater surface elevations ranged from 15.28 ft at MW-1 to 14.28 ft at MW-3. Groundwater elevations are summarized in Table 1. Water level elevations yielded a potentiometric groundwater gradient to the South-Southwest at approximately 0.011 ft/ft. Field methods used during groundwater monitoring are provided in Appendix A. Field data sheets are included in Appendix B. A Site Location Map is presented as Drawing 1.

Groundwater samples were collected on August 15, 2012 consistent with the current monitoring schedule. No irregularities were reported during sampling. Samples were submitted under chain-of-custody protocol to the new contract laboratory TestAmerica Laboratories, Inc. (Irvine, California) for analysis of Gasoline-Range Organics (GRO, C6-C12) and Diesel-Range Organics (DRO, C10-C28) by EPA Method 5030B/8015B; for Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX), Methyl Tertiary Butyl Ether (MTBE), Ethyl Tertiary Butyl Ether (ETBE), Tert-Amyl Methyl Ether (TAME), Di-Isopropyl Ether (DIPE), 1,2-Dibromomethane (EDB), 1,2-Dichloroethane (1,2-DCA), Tert-Butyl Alcohol (TBA) and Ethanol by EPA Method 5030B/8260B. The laboratory noted evidence of matrix interference was present during the GRO analysis of the sample from MW-1, and the hydrocarbon result in MW-3 during DRO analysis was partly due to individual peak(s) in the quantitation range. No other significant irregularities were encountered during analysis of the samples. The laboratory analytical report, including chain-of-custody documentation, is provided in Appendix C.

Hydrocarbons in the DRO range were detected above the laboratory reporting limit at a concentration of 220 micrograms per liter (µg/L, parts per billion, ppb) in well MW-1 and 600 micrograms per liter in well MW-3 (however the laboratory noted the hydrocarbon result in MW-3 was partly due to individual peaks in the quantitation range). Hydrocarbons in the GRO range were detected above the laboratory reporting limit at a concentration of 490 µg/L in well MW-1 (however the laboratory noted evidence of matrix interference). The remaining analytes were not detected above their laboratory reporting limits in the wells sampled this monitoring event. Groundwater monitoring laboratory analytical results are summarized in Table 1, Table 2 and Appendix C. The most recent GRO, Benzene, and MTBE concentrations are also presented in Drawing 2. Groundwater monitoring data (GEO_WELL) and laboratory analytical results (EDF) were uploaded to the GeoTracker AB2886 database. Upload confirmation receipts are provided in Appendix D.

DISCUSSION:

Groundwater levels were between historic minimum and maximum elevations for each well. Water level elevations yielded a potentiometric groundwater gradient to the South-Southwest at approximately 0.011 ft/ft. This generally flat gradient is consistent with historical measurements.

This event's detected analytical concentrations were within the historic minimum and maximum ranges recorded for each well, with the exception of DRO concentrations in wells MW-1 and MW-3 which were recorded as historical maximum values. However, the laboratory noted evidence of matrix interference was present during the GRO analysis of the sample from MW-1, and the hydrocarbon result in MW-3 during DRO analysis was partly due to individual peak(s) in the quantitation range. In the past, the laboratory noted the chromatogram did not resemble the laboratory standard for diesel and gasoline, which may be due to significant breakdown of aged fuel, or some other contaminant. No other constituents analyzed were detected above the laboratory reporting limits.

RECOMMENDATIONS:

Consistent with the revised monitoring schedule, no monitoring or sampling field work is planned for Fourth Quarter 2012. In light of the findings contained herein, Broadbent recommends discontinuation of the periodic groundwater monitoring at this site. Furthermore, ACEH is requested to review the case as a candidate for site closure under the State Water Resources Control Board's Low-Threat Underground Storage Tank Case Closure Policy. Broadbent had completed a *Case Evaluation and Justification for No Further Action* Report (submitted 11/28/2011) to which no reply had ever been received from the ACEH. On September 12, 2012, BP sent a letter to ACEH recalling the *Case Evaluation and Justification for No Further Action* Report. A revised UST Case Summary and Request for Closure report, consistent with the State Water Resources Control Board's Low-Threat Underground Storage Tank Case Closure Policy, is under preparation for submittal to ACEH in the near future.

LIMITATIONS:

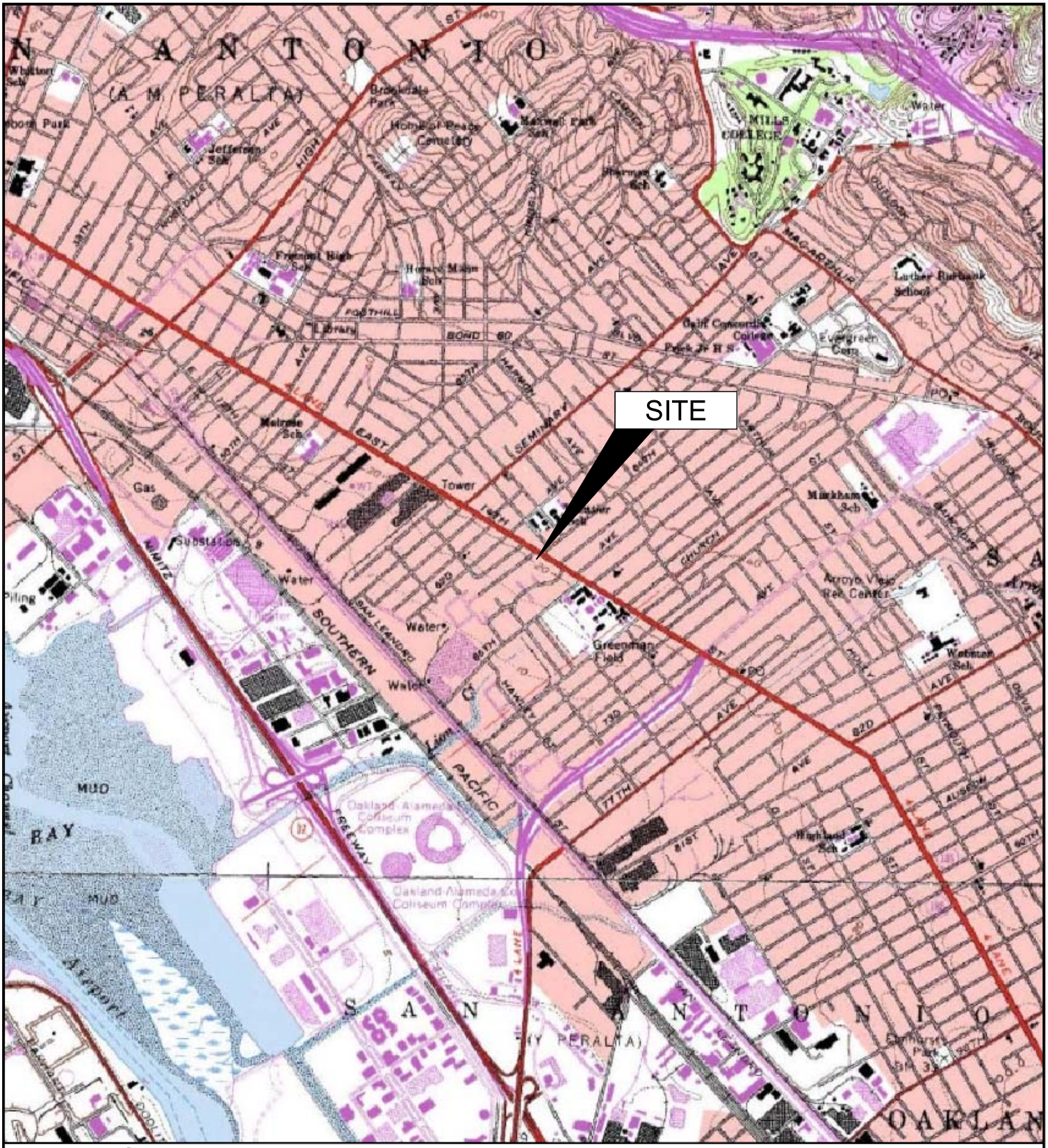
The findings presented in this report are based upon observations of field personnel, points investigated, results of laboratory tests performed by TestAmerica Laboratories, Inc. (Irvine, California), and our understanding of ACEH requirements. Our services were performed in accordance with the generally accepted standard of practice at the time this report was written. No other warranty, expressed or implied was made. This report has been prepared for the exclusive use of the Atlantic Richfield Company. It is possible that variations in soil or groundwater conditions could exist beyond points explored in this investigation. Also, changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

ATTACHMENTS:

Drawing 1:	Site Location Map
Drawing 2:	Groundwater Elevation and Analytical Summary Map, 15 August 2012
Table 1:	Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses
Table 2:	Summary of Fuel Additives Analytical Data
Table 3:	Historic Groundwater Gradient – Direction and Magnitude
Appendix A:	Field Methods
Appendix B:	Field Data Sheets
Appendix C:	Laboratory Report and Chain-of-Custody Documentation
Appendix D:	GeoTracker Upload Confirmation Receipts

LIST OF COMMONLY USED ACCRONYMS/ABBREVIATIONS:

ACEH:	Alameda County Environmental Health	ft/ft:	feet per foot
ACPWA:	Alameda County Public Works Agency	gal:	Gallons
BTEX:	Benzene, Toluene, Ethylbenzene, Total Xylenes	GRO:	Gasoline-Range Organics
1,2-DCA:	1,2-Dichloroethane	LNAPL:	Light Non-Aqueous Phase Liquid
DIPE:	Di-Isopropyl Ether	MTBE:	Methyl Tertiary Butyl Ether
DO:	Dissolved Oxygen	NO_3:	Nitrate as Nitrogen
DRO:	Diesel-Range Organics	ppb:	parts per billion
EDB:	1,2-Dibromomethane	SO_4:	Sulfate
Eh:	Oxidation Reduction Potential	TAME:	Tert-Amyl Methyl Ether
EPA:	Environmental Protection Agency	TBA:	Tertiary Butyl Ether
ETBE:	Ethyl Tertiary Butyl Ether	TOC:	Top of Casing
Fe^{2+}:	Ferrous Iron	µg/L:	micrograms per liter



N

0 2000 4000

APPROXIMATE SCALE (ft)

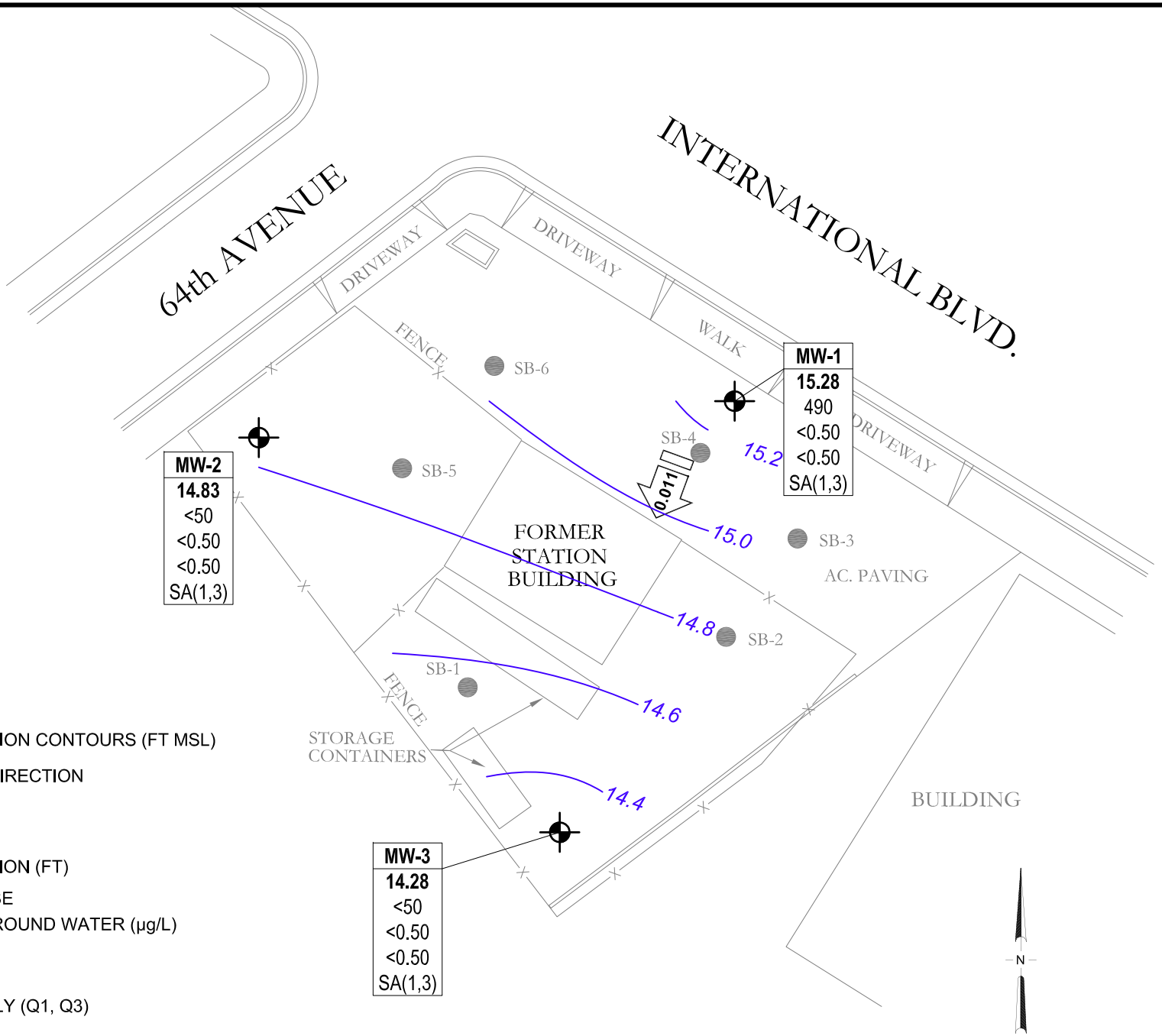
IMAGE SOURCE: USGS

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave. Suite 212, Chico, CA 95926
Project No.: 09-88-601 Date: 07/31/09

Former Station #472
6415 International Boulevard
Oakland, California

Site Location Map

Drawing
1



LEGEND

- MONITORING WELL
- SOIL BORING
- 15.0 — GROUNDWATER ELEVATION CONTOURS (FT MSL)
- 0.011 — GROUNDWATER FLOW DIRECTION AND GRADIENT (FT/FT)

Well	WELL DESIGNATION
ELEV	GROUNDWATER ELEVATION (FT)
GRO	GRO, BENZENE AND MTBE CONCENTRATIONS IN GROUND WATER (µg/L)
Benzene	
MTBE	
Q/SA/A	SAMPLING FREQUENCY

SA(1,3) SAMPLED SEMI-ANNUALLY (Q1, Q3)

0 30 60
SCALE (ft)

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave. Suite 212, Chico, California
Project No.: 09-88-601 Date: 09/04/2012

Former Station #472
6415 International Boulevard
Oakland, California

Groundwater Elevation and
and Analytical Summary Map
15 August 2012

Drawing
2

Table 1. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	P/NP	TOC Elevation (feet)	DTW (feet)	Product Thickness (feet)	Water Level Elevation (feet)	Concentrations in µg/L								DO (mg/L)	pH	Footnote
						GRO/ TPHg	DRO/ TPHd	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MtBE	TOG			
MW-1																
8/25/2009	P	24.17	9.29	0.00	14.88	530	190	<0.50	<0.50	<0.50	<0.50	0.54	--	--	7.21	LX (DRO)
11/11/2009	NP		8.22	0.00	15.95	<50	--	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	
2/17/2010	NP		7.36	0.00	16.81	<50	70	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.69	7.03	LX (DRO)
6/2/2010	NP		7.61	0.00	16.56	110	120	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.21	7.0	LW (GRO), LX (DRO)
9/3/2010	NP		8.99	0.00	15.18	1,000	190	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.74	7.30	LW (GRO), LX (DRO)
2/8/2011	NP		7.69	0.00	16.48	<50	53	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.64	6.8	LX (DRO)
7/18/2011	NP		7.99	0.00	16.18	<50	110	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.70	7.2	LX (DRO)
3/1/2012	P		8.20	0.00	15.97	500	140	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.71	7.01	
8/15/2012	**P**		**8.89**	**0.00**	**15.28**	**490**	**220**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**	**--**	**8.90**	**7.53**	
MW-2																
8/25/2009	P	23.62	9.65	0.00	13.97	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	7.30	
11/11/2009	NP		8.09	0.00	15.53	<50	--	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	
2/17/2010	P		6.80	0.00	16.82	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.62	7.15	
6/2/2010	NP		7.11	0.00	16.51	<50	65	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.85	7.3	LX (DRO)
9/3/2010	NP		8.79	0.00	14.83	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.19	7.90	
2/8/2011	NP		7.21	0.00	16.41	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.15	7.0	
7/18/2011	--		--	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
3/1/2012	P		7.41	0.00	16.21	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.89	7.34	
8/15/2012	**P**		**8.79**	**0.00**	**14.83**	**<50**	**<47**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**	**--**	**3.3**	**7.48**	
MW-3																
8/25/2009	P	24.73	11.07	0.00	13.66	63	85	<0.50	1.2	<0.50	<0.50	<0.50	--	--	7.09	
11/11/2009	NP		9.56	0.00	15.17	88	--	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	LW (GRO)
2/17/2010	NP		8.52	0.00	16.21	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.04	7.09	
6/2/2010	NP		8.64	0.00	16.09	100	130	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.22	7.1	LW (GRO), LX (DRO)
9/3/2010	NP		8.41	0.00	16.32	200	140	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.87	6.9	LW (GRO), LX (DRO)
2/8/2011	NP		8.82	0.00	15.91	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.88	7.0	
7/18/2011	NP		9.20	0.00	15.53	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.93	6.9	
3/1/2012	P		9.13	0.00	15.60	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.63	6.91	
8/15/2012	**P**		**10.45**	**0.00**	**14.28**	**<50**	**600**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**	**--**	**2.99**	**7.38**	***(DRO)**

Symbols & Abbreviations:
--- = Not analyzed/applicable/measured/available
< = Not detected at or above specified laboratory reporting limit
DO = Dissolved oxygen
DRO = Diesel range organics
DTW = Depth to water in ft bgs
GRO = Gasoline range organics
GWE = Groundwater elevation measured in ft
HVOC = Halogenated volatile organic compounds
mg/L = Milligrams per liter
MTBE = Methyl tert-butyl ether
NP = Well not purged prior to sampling
P = Well purged prior to sampling
TOC = Top of casing measured in ft
TOG = Total oil and grease
TPH-d = Total petroleum hydrocarbons as diesel
TPH-g = Total petroleum hydrocarbons as gasoline
µg/L = Micrograms per liter
CEL = CalScience Environmental Laboratories, Inc.
* = Hydrocarbon result partly due to individual peak(s) in the quantitation range

Footnotes:
LW = Quantitation of unknown hydrocarbon(s) in sample based on gasoline
LX = Quantitation of unknown hydrocarbon(s) in sample based on diesel

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
MW-1									
8/25/2009	<300	<10	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72 µg/L sec-Butylbenzene, 1.4 µg/L tert-Butylben
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
3/1/2012	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
8/15/2012	**<150**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	
MW-2									
8/25/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	--	--	--	--	--	--	--	--	Inaccessible
3/1/2012	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
8/15/2012	**<150**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	
MW-3									
8/25/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
3/1/2012	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
8/15/2012	**<150**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	

Symbols & Abbreviations:
-- = Not analyzed/applicable/measured/available
< = Not detected at or above specified laboratory reporting limit
1,2-DCA = 1,2-Dichloroethane
DIPE = Diisopropyl ether
EDB = 1,2-Dibromoethane
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether
TAME = tert-Amyl methyl ether
TBA = tert-Butyl alcohol
µg/L = Micrograms per Liter

Notes:
All volatile organic compounds were analyzed using EPA Method 8260B

Table 3. Historical Groundwater Gradient - Direction and Magnitude

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
8/25/2009	Southwest	0.01
11/11/2009	South-Southwest	0.008
2/17/2010	South	0.006
6/2/2010	South	0.003
9/3/2010	North-Northwest	0.015
2/8/2011	South	0.006
7/18/2011	(a)	(a)
3/1/2012	South-Southeast	0.006
8/15/2012	**South-Southwest**	**0.011**

Footnotes:

a = Groundwater gradient unable to be calculated due to MW-2 being inaccessible

APPENDIX A

FIELD METHODS

QUALITY ASSURANCE/QUALITY CONTROL
FIELD METHODS

Field methods discussed herein were implemented to provide for accuracy and reliability of field activities, data collection, sample collection, and handling. Discussion of these methods is provided below.

1.0 EQUIPMENT CALIBRATION

Equipment calibration was performed per equipment manufacturer specifications before use.

2.0 DEPTH TO GROUNDWATER AND LIGHT NON-AQUEOUS PHASE LIQUID MEASUREMENT

Depth to groundwater was measured in wells identified for gauging in the scope of work using a decontaminated water level indicator. The depth to water measurement was taken from a cut notch or permanent mark at the top of the well casing to which the well head elevation was originally surveyed.

Once depth to water was measured, an oil/water interface meter or a new disposable bailer was utilized to evaluate the presence and, if present, to measure the "apparent" thickness of light non-aqueous phase liquid (LNAPL) in the well. If LNAPL was present in the well, groundwater purging and sampling were not performed, unless sampling procedures in the scope of work specified collection of samples in the presence of LNAPL. Otherwise, time allowing, LNAPL was bailed from the well using either a new disposable bailer, or the disposal bailer previously used for initial LNAPL assessment. Bailing of LNAPL continued until the thickness of LNAPL (or volume) stabilized in each bailer pulled from the well, or LNAPL was no longer present. After LNAPL thickness either stabilized or was eliminated, periodic depth to water and depth to LNAPL measurements were collected as product came back into the well to evaluate product recovery rate and to aid in further assessment of LNAPL in the subsurface. LNAPL thickness measurements were recorded as "apparent." If a bailer was used for LNAPL thickness measurement, the field sampler noted the bailer entry diameter and chamber diameter to enable correction of thickness measurements. Recovered LNAPL was stored on-site in a labeled steel drum(s) or other appropriate container(s) prior to disposal.

3.0 WELL PURGING AND GROUNDWATER SAMPLE COLLECTION

Well purging and groundwater sampling were performed in wells specified in the scope of work after measuring depth to groundwater and evaluating the presence of LNAPL. Purging and sampling were performed using one of the methods detailed below. The method used was noted in the field records. Purge water was stored on-site in labeled steel drum(s) or other appropriate container(s) prior to disposal or on-site treatment (in cases where treatment using an on-site system is authorized).

3.1 Purging a Predetermined Well Volume

Purging a predetermined well volume is performed per ASTM International (ASTM) D4448-01. This purging method has the objective of removing a predetermined volume of stagnant water from the well prior to sampling. The volume of stagnant water is defined as either the volume of water contained within the well casing, or the volume within the well casing and sand/gravel in the annulus if natural flow through these is deemed insufficient to keep them flushed out.

This purging method involves removal of a minimum of three stagnant water volumes from the well using a decontaminated pump with new disposable plastic discharge or suction tubing, dedicated well tubing, or using a new disposable or decontaminated reusable bailer. If a new disposable bailer was used for assessment of LNAPL, that bailer may be used for purging. The withdrawal rate used is one that minimizes drawdown while satisfying time constraints.

To evaluate when purging is complete, one or more groundwater stabilization parameters are monitored and recorded during purging activities until stabilization is achieved. Most commonly, stabilization parameters include temperature, conductivity, and pH, but field procedures detailed in the scope of work may also include monitoring of dissolved oxygen concentrations, oxidation reduction potential, and/or turbidity[1]. Parameters are considered stable when two (2) consecutive readings recorded three (3) minutes apart fall within ranges provided below in Table 1. In the event that the parameters have not stabilized and five (5) well casing volumes have been removed, purging activities will cease and be considered complete. Once the well is purged, a groundwater sample(s) is collected from the well using a new disposable bailer. If a new disposable bailer was used for purging, that bailer may be used to collect the sample(s). A sample is not collected if the well is inadvertently purged dry.

Table 1. Criteria for Defining Stabilization of Water-Quality Indicator Parameters

Parameter	Stabilization Criterion
Temperature	± 0.2ºC (± 0.36ºF)
pH	± 0.1 standard units
Conductivity	± 3%
Dissolved oxygen	± 10%
Oxidation reduction potential	± 10 mV
Turbidity[1]	± 10% or 1.0 NTU (whichever is greater)

3.2 Low-Flow Purging and Sampling

“Low-Flow”, “Minimal Drawdown”, or "Low-Stress” purging is performed per ASTM D6771-02. It is a method of groundwater removal from within a well’s screened interval that is intended to minimize drawdown and mixing of the water column in the well

[1] As stated in ASTM D6771-02, turbidity is not a chemical parameter and not indicative of when formation-quality water is being purged; however, turbidity may be helpful in evaluating stress on the formation during purging. Turbidity measurements are taken at the same time that stabilization parameter measurements are made, or, at a minimum, once when purging is initiated and again just prior to sample collection, after stabilization parameters have stabilized. To avoid artifacts in sample analysis, turbidity should be as low as possible when samples are collected. If turbidity values are persistently high, the withdrawal rate is lowered until turbidity decreases. If high turbidity persists even after lowering the withdrawal rate, the purging is stopped for a period of time until turbidity settles, and the purging process is then restarted. If this fails to solve the problem, the purging/sampling process for the well is ceased, and well maintenance or redevelopment is considered.

casing. This is accomplished by pumping the well using a decontaminated pump with new disposable plastic discharge or suction tubing or dedicated well tubing at a low flow rate while evaluating the groundwater elevation during pumping.

The low flow pumping rate is well specific and is generally established at a volume that is less than or equal to the natural recovery rate of the well. A pump with adjustable flow rate control is positioned with the intake at or near the mid-point of the submerged well screen. The pumping rate used during low-flow purging is low enough to minimize mobilization of particulate matter and drawdown (stress) of the water column. Low-flow purging rates will vary based on the individual well characteristics; however, the purge rate should not exceed 1.0 Liter per minute (L/min) or 0.25 gallon per minute (gal/min). Low-flow purging should begin at a rate of approximately 0.1 L/min (0.03 gal/min)[2], or the lowest rate possible, and be adjusted based on an evaluation of drawdown. Water level measurements should be recorded at approximate one (1) to two (2) minute intervals until the low-flow rate has been established, and drawdown is minimized. As a general rule, drawdown should not exceed 25% of the distance between the top of the water column and the pump in-take.

To evaluate when purging is complete, one or more groundwater stabilization parameters are monitored and recorded during purging activities until stabilization is achieved. Most commonly, stabilization parameters include temperature, conductivity, and pH, but field procedures detailed in the scope of work may also include monitoring of dissolved oxygen concentrations, oxidation reduction potential, and/or turbidity[1]. The frequency between measurements will be at an interval of one (1) to three (3) minutes; however, if a flow cell is used, the frequency will be determined based on the time required to evacuate one cell volume. Stabilization is defined as three (3) consecutive readings recorded several minutes apart falling within ranges provided in Table 1. Samples will be collected by filling appropriate containers from the pump discharge tubing at a rate not to exceed the established pumping rate.

3.3 Minimal Purge, Discrete Depth, and Passive Sampling

In accordance with ASTM D4448-01, sampling techniques that do not rely on purging, or require only minimal purging, may be used if a particular zone within a screened interval is to be sampled or if a well is not capable of yielding sufficient groundwater for purging. To properly use these sampling techniques, a water sample is collected within the screened interval with little or no mixing of the water column within the casing. These techniques include minimal purge sampling which uses a dedicated sampling pump capable of pumping rates of less than 0.1 L/min (0.03 gal/min)[2], discrete depth sampling using a bailer that allows groundwater entry at a controlled depth (e.g. differential pressure bailer), or passive (diffusion) sampling. These techniques are based on certain studies referenced in ASTM D4448-01 that indicate that under certain conditions, natural groundwater flow is laminar and horizontal with little or no mixing within the well screen.

[2] According to ASTM D4448-01, studies have indicated that at flow rates of 0.1 L/min, low-density polyethylene (LDPE) and plasticized polypropylene tubing materials are prone to sorption. Therefore, TFE-fluorocarbon or other appropriate tubing material is used, particularly when tubing lengths of 50 feet or longer are used.

4.0 DECONTAMINATION

Reusable groundwater sampling equipment were cleaned using a solution of Alconox or other acceptable detergent, rinsed with tap water, and finally rinsed with distilled water prior to use in each well. Decontamination water was stored on-site in labeled steel drum(s) or other appropriate container(s) prior to disposal.

5.0 SAMPLE CONTAINERS, LABELING, AND STORAGE

Samples were collected in laboratory prepared containers with appropriate preservative (if preservative was required). Samples were labeled (site name, sample I.D., sampler initials, date, and time of collection) and stored chilled (refrigerator or ice chest with ice) until delivery to a certified laboratory, under chain of custody procedures.

6.0 CHAIN OF CUSTODY RECORD AND PROCEDURE

The field sampler was personally responsible for care and custody of the samples collected until they were properly transferred to another party. To document custody and transfer of samples, a Chain of Custody Record was prepared. The Chain of Custody Record provided identification of the samples corresponding to sample labels and specified analyses to be performed by the laboratory. The original Chain of Custody Record accompanied the shipment, and a copy of the record was stored in the project file. When the samples were transferred, the individuals relinquishing and receiving them signed, dated, and noted the time of transfer on the record.

7.0 FIELD RECORDS

Daily Report and data forms were completed by staff personnel to provide daily record of significant events, observations, and measurements. Field records were signed, dated, and stored in the project file.

APPENDIX B

FIELD DATA SHEETS

BROADBENT

DAILY REPORT

Page 1 of 1

Project: BP 472 Project No.: 09-88-601

Field Representative(s): JR/AM Day: Wednesday Date: 8-15-12

Time Onsite: From: 0915 To: 1230 ; From: ____ To: ____ ; From: ____ To: ____

X Signed HASP X Safety Glasses X Hard Hat X Steel Toe Boots X Safety Vest

X UST Emergency System Shut-off Switches Located X Proper Gloves

X Proper Level of Barricading ___ Other PPE (describe) ____

Weather: overcast ; 58°F

Equipment In Use: bailers, Horiba, water level indicator

Visitors: ____

TIME:	WORK DESCRIPTION:
0915	Arrived on-site; proceeded w/paperwork & safety meeting
0945	Set up @ MW-2
1040	Set up @ MW-1
1125	Set up @ MW-3
1230	Completed fieldwork/offsite

Signature: ____

Revision: 1/24/2012

BROADBENT & ASSOCIATES, INC.
ENVIRONMENTAL, WATER RESOURCES & ENGINEERING

GROUNDWATER MONITORING SITE SHEET

Project: BP 472 Project No.: 09-88-601 Date: 8-15-12

Field Representative: JR/AM Elevation: _____

Formation recharge rate is historically: High Low *(circle one)*

W. L. Indicator ID #: _____ Oil/Water Interface ID #: _____ *(List #s of all equip used.)*

WELL ID RECORD					WELL GAUGING RECORD					LAB ANALYSES					
Well ID	Well Sampling Order	As-Built Well Diameter (inches)	As-Built Well Screen Interval (ft)	Previous Depth to Water (ft)	Time (24:00)	Depth to LNAPL (ft)	Apparent LNAPL Thickness (ft)*	Depth to Water (ft)	Well Total Depth (ft)						
MW-3					1129	-	-	10.45	17.09						
MW-1					1040	-	-	8.89	16.70						
MW-2					0949	-	-	8.79	17.09						

* Device used to measure LNAPL thickness: Bailer Oil/Water Interface Meter *(circle one)*

If bailer used, note bailer dimensions (inches): Entry Diameter _____ Chamber Diameter _____

Signature: _____

Revision: 8/19/11

GROUNDWATER SAMPLING DATA SHEET

Project: BP 472 Project No.: 09-88-601 Date: 8-15-12

Field Representative: JR/AM

Well ID: MW-1 Start Time: _____ End Time: _____ Total Time (minutes): _____

PURGE EQUIPMENT X Disp. Bailer ___ 120V Pump ___ Flow Cell
___ Disp. Tubing ___ 12V Pump ___ Peristaltic Pump Other/ID#:

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments:
Good Improvement Needed *(circle one)*

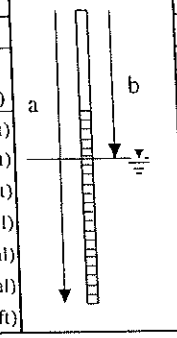
PURGING/SAMPLING METHOD Predetermined Well Volume Low-Flow Other: *(circle one)*

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) *(circle one)*

1" | (0.04) 1.25" | (0.08) 2" | (0.17) 3" | (0.38) Other:
4" | (0.66) 6" | (1.50) 8" | (2.60) 12" | (5.81) ___" | (___)

Total Well Depth (a): 16.7 (ft)
Initial Depth to Water (b): 8.89 (ft)
Water Column Height (WCH) = (a - b): 7.81 (ft)
Water Column Volume (WCV) = WCH x Unit Volume: 5.15 (gal)
Three Casing Volumes = WCV x 3: 15.45 (gal)
Five Casing Volumes = WCV x 5: 25.75 (gal)
Pump Depth (if pump used): _____ (ft)



LOW-FLOW

Previous Low-Flow Purge Rate: _____ (lpm)
Total Well Depth (a): _____ (ft)
Initial Depth to Water (b): _____ (ft)
Pump In-take Depth = b + (a-b)/2: _____ (ft)
Maximum Allowable Drawdown = (a-b)/8: _____ (ft)
Low-Flow Purge Rate: _____ (Lpm)*
Comments:

**Low-flow purge rate should be within range of instruments used but should not exceed 0.25 gpm. Drawdown should not exceed Maximum Allowable Drawdown.*

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Volume (gal)	Temperature °C	pH	Conductivity µS or mS	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
1046	0	23.45	7.34	0.686	8.90	-40	205	slight HC odor
1053	4	23.58	7.29	0.692	—	-43	83	
1059	8	23.33	7.32	0.695	—	-37	—	
1105	12	22.98	7.40	0.700	—	-48	—	
1108	16.5	22.72	7.43	0.709	—	-54	—	
1111	16	22.97	7.33	0.705	—	-50	64.9	
Previous Stabilized Parameters								

PURGE COMPLETION RECORD ___ Low Flow & Parameters Stable ___ 3 Casing Volumes & Parameters Stable ___ 5 Casing Volumes
___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 14.24 (ft)
Sample Collected Via: X Disp. Bailer ___ Dedicated Pump Tubing
___ Disp. Pump Tubing Other:
Sample ID: MW-1 Sample Collection Time: 1115 (24:00)
Containers (#): 6 VOA (X preserved or ___ unpreserved) ___ Liter Amber
2 Other: NP & 1L Amber ___ Other: _____
___ Other: _____ ___ Other: _____

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)	1046	8.90
Ferrous Iron (mg/L)		
Redox Potential (mV)	1111	-50
Alkalinity (mg/L)		
Other:		
Other:		

Signature: James Ran

GROUNDWATER SAMPLING DATA SHEET

Project: BP472 Project No.: 09-88-601 Date: 8-15-12

Field Representative: JR/AM

Well ID: MW-2 Start Time: _____ End Time: _____ Total Time (minutes): _____

PURGE EQUIPMENT X Disp. Bailer ___ 120V Pump ___ Flow Cell
___ Disp. Tubing ___ 12V Pump ___ Peristaltic Pump Other/ID#:

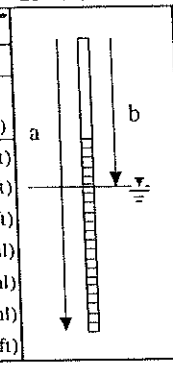
WELL HEAD INTEGRITY (cap. lock. vault. etc.) Comments:
Good Improvement Needed *(circle one)*

PURGING/SAMPLING METHOD Predetermined Well Volume Low-Flow Other: *(circle one)*

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) *(circle one)*

1" | (0.04) 1.25" | (0.08) 2" | (0.17) 3" | (0.38) Other:
4" | (0.66) 6" | (1.50) 8" | (2.60) 12" | (5.81) ___" | (___)



Total Well Depth (a):	17.09 (ft)
Initial Depth to Water (b):	8.79 (ft)
Water Column Height (WCH) = (a - b):	8.30 (ft)
Water Column Volume (WCV) = WCH x Unit Volume:	5.47 (gal)
Three Casing Volumes = WCV x 3:	16.41 (gal)
Five Casing Volumes = WCV x 5:	___ (gal)
Pump Depth (if pump used):	___ (ft)

LOW-FLOW

Previous Low-Flow Purge Rate:	___ (lpm)
Total Well Depth (a):	___ (ft)
Initial Depth to Water (b):	___ (ft)
Pump In-take Depth = b + (a-b)/2:	___ (ft)
Maximum Allowable Drawdown = (a-b)/8:	___ (ft)
Low-Flow Purge Rate:	___ (Lpm)*
Comments:	

**Low-flow purge rate should be within range of instruments used but should not exceed 0.25 gpm. Drawdown should not exceed Maximum Allowable Drawdown.*

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Volume (L)	Temperature °C	pH	Conductivity µS or (mS)	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
0956	0.0	20.55	7.67	0.423	3.30	17	0.0	
1010	4.0	21.03	7.40	0.420	-	16	—	
1012	8.0	21.15	7.40	0.424	-	82	—	
1020	12.0	21.27	7.40	0.422	-	82	—	
1024	16.0	21.30	7.40	0.422	-	84	—	
1026	17.0	21.31	7.48	0.425	-	84	1000	
Previous Stabilized Parameters								

PURGE COMPLETION RECORD ___ Low Flow & Parameters Stable X 3 Casing Volumes & Parameters Stable ___ 5 Casing Volumes
___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 9.07 (ft)

Sample Collected Via: X Disp. Bailer ___ Dedicated Pump Tubing
___ Disp. Pump Tubing Other:

Sample ID: MW-2 Sample Collection Time: 1030 (24:00)

Containers (#): 6 VOA (X preserved or ___ unpreserved) ___ Liter Amber
2 Other: 500 mL Amber ___ Other:
___ Other: ___ Other:

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)	0956	3.30
Ferrous Iron (mg/L)		
Redox Potential (mV)	1030	84
Alkalinity (mg/L)		
Other:		
Other:		

Signature:

GROUNDWATER SAMPLING DATA SHEET

Project: BP 472 Project No.: 09-88-601 Date: 8-15-12

Field Representative: JR/AM

Well ID: MW-3 Start Time: _____ End Time: _____ Total Time (minutes): _____

PURGE EQUIPMENT X Disp. Bailer ___ 120V Pump ___ Flow Cell
___ Disp. Tubing ___ 12V Pump ___ Peristaltic Pump Other/ID#:

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments:
(Good) Improvement Needed *(circle one)*

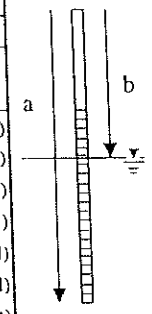
PURGING/SAMPLING METHOD (Predetermined Well Volume) Low-Flow Other: *(circle one)*

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) *(circle one)*

1" | (0.04) 1.25" | (0.08) 2" | (0.17) 3" | (0.38) Other: ___" | (___)
(4" | (0.66)) 6" | 1.50) 8" | (2.60) 12" | (5.81)

Total Well Depth (a): 17.09 (ft)
Initial Depth to Water (b): 10.45 (ft)
Water Column Height (WCH) = (a - b): 6.64 (ft)
Water Column Volume (WCV) = WCH x Unit Volume: 4.38 (gal)
Three Casing Volumes = WCV x 3: 13.14 (gal)
Five Casing Volumes = WCV x 5: _____ (gal)
Pump Depth (if pump used): _____ (ft)



LOW-FLOW

Previous Low-Flow Purge Rate: _____ (lpm)
Total Well Depth (a): _____ (ft)
Initial Depth to Water (b): _____ (ft)
Pump In-take Depth = b + (a-b)/2: _____ (ft)
Maximum Allowable Drawdown = (a-b)/8: _____ (ft)
Low-Flow Purge Rate: _____ (Lpm)*
Comments:

**Low-flow purge rate should be within range of instruments used but should not exceed 0.25 gpm. Drawdown should not exceed Maximum Allowable Drawdown.*

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Volume (gal)	Temperature °C	pH	Conductivity µS or (mS)	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
1135	0.0	21.62	7.35	0.894	2.99	50	14.5	
1146	4.5	20.80	7.30	0.919	—	-36	—	
1150	9.0	20.26	7.33	0.922	—	-67	—	
1153	13.5	19.62	7.37	0.910	—	-80	—	
1156	14.5	19.57	7.38	0.907	—	-83	240	
Previous Stabilized Parameters								

PURGE COMPLETION RECORD ___ Low Flow & Parameters Stable X 3 Casing Volumes & Parameters Stable ___ 5 Casing Volumes
___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 14.13 (ft)
Sample Collected Via: X Disp. Bailer ___ Dedicated Pump Tubing
___ Disp. Pump Tubing Other:
Sample ID: MW-3 Sample Collection Time: 1159 (24:00)
Containers (#): 6 VOA (X preserved or ___ unpreserved) ___ Liter Amber
2 Other: 1 L Amber ___ Other: _____
___ Other: _____ ___ Other: _____

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)	1135	2.99
Ferrous Iron (mg/L)		
Redox Potential (mV)	1156	-83
Alkalinity (mg/L)		
Other:		
Other:		

Signature: _____

NO. 689904

NON-HAZARDOUS WASTE DATA FORM

BEST #

GENERATOR

Generator's Name and Mailing Address

BP WEST COAST PRODUCTS, LLC
P.O. BOX 80249
RANCHO SANTA MARGARITA, CA 92688

Generator's Site Address (if different than mailing address)

BP 472
6415 International Blvd
Oakland, California

Generator's Phone: 949-460-5200

Container type removed from site:

☐ Drums ☐ Vacuum Truck ☐ Roll-off Truck ☐ Dump Truck

☐ Other _____

Quantity 47.5 (g)

Container type transported to receiving facility:

☐ Drums ☐ Vacuum Truck ☐ Roll-off Truck ☐ Dump Truck

☐ Other _____

Quantity _____ Volume _____

WASTE DESCRIPTION NON-HAZARDOUS WATER

GENERATING PROCESS WELL PURGING / DECON WATER

COMPONENTS OF WASTE	PPM	%
1. WATER		99-100%
2. TPH		<1%
3.		
4.		

Waste Profile _____ PROPERTIES: pH 7-10 ☐ SOLID ☒ LIQUID ☐ SLUDGE ☐ SLURRY ☐ OTHER _____

HANDLING INSTRUCTIONS: WEAR ALL APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT.

Generator Printed/Typed Name: James Ramos | Signature: James Ramos | Month 8 | Day 15 | Year 12

The Generator certifies that the waste as described is 100% non-hazardous

TRANSPORTER

Transporter 1 Company Name: BROADBENT & ASSOCIATES, INC> | Phone#: 530-566-1400

Transporter 1 Printed/Typed Name: James Ramos | Signature: James Ramos | Month 8 | Day 15 | Year 12

Transporter Acknowledgment of Receipt of Materials

Transporter 2 Company Name | Phone#

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

Transporter Acknowledgment of Receipt of Materials

RECEIVING FACILITY

Designated Facility Name and Site Address: INSTRAT, INC. 1105 AIRPORT RD. RIO VISTA, CA 94571 | Phone#: 530-753-1629

Printed/Typed Name | Signature | Month | Day | Year

Designated Facility Owner or Operator: Certification of receipt of materials covered by this data form.

APPENDIX C

LABORATORY REPORT
AND CHAIN-OF-CUSTODY DOCUMENTATION

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

TestAmerica Job ID: 440-20673-1
Client Project/Site: ARCO 0472, Oakland

For:
Broadbent & Associates, Inc.
1324 Mangrove Ave
Suite 212
Chico, California 95926

Attn: Tom Venus

Authorized for release by:
8/30/2012 7:26:43 PM

Pat Abe
Project Manager I
pat.abe@testamericainc.com

Table of Contents

Cover Page 1
Table of Contents 2
Sample Summary 3
Case Narrative 4
Client Sample Results 5
Chronicle 8
QC Sample Results 9
QC Association 15
Definitions 16
Certification Summary 17
Chain of Custody 18
Receipt Checklists 19

Sample Summary

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0472, Oakland

TestAmerica Job ID: 440-20673-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-20673-1	MW-1	Water	08/15/12 11:15	08/16/12 09:45
440-20673-2	MW-2	Water	08/15/12 10:30	08/16/12 09:45
440-20673-3	MW-3	Water	08/15/12 11:59	08/16/12 09:45

Job ID: 440-20673-1

Laboratory: TestAmerica Irvine

Narrative

Job Narrative
440-20673-1

Comments
No additional comments.

Receipt
The samples were received on 8/16/2012 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.7º C.

GC/MS VOA
Method(s) 8260B: Due to the high concentration of MTBE in the source sample, the matrix spike / matrix spike duplicate (MS/MSD) calculation does not provide useful spike recovery and precision information for batch 46911. The batch was accepted based on acceptable recoveries in the associated laboratory control sample (LCS).

No other analytical or quality issues were noted.

GC VOA
Method(s) 8015B: Surrogate recovery for the following sample(s) was outside control limits: MW-1 (440-20673-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

No other analytical or quality issues were noted.

GC Semi VOA
Method(s) 8015B: Hydrocarbon result partly due to individual peak(s) in quantitation range. MW-3 (440-20673-3).

No other analytical or quality issues were noted.

Organic Prep
Method(s) 3510C: Insufficient sample volume was received to perform matrix spike / matrix spike duplicate (MS/MSD) data for prep batch 47011. A laboratory control sample duplicate (LCSD) was analyzed to generate precision data for the batch.

No other analytical or quality issues were noted.

VOA Prep
No analytical or quality issues were noted.

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0472, Oakland

TestAmerica Job ID: 440-20673-1

Client Sample ID: MW-1
Date Collected: 08/15/12 11:15
Date Received: 08/16/12 09:45

Lab Sample ID: 440-20673-1
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			08/22/12 03:41	1
1,2-Dichloroethane	ND		0.50		ug/L			08/22/12 03:41	1
Benzene	ND		0.50		ug/L			08/22/12 03:41	1
Ethanol	ND		150		ug/L			08/22/12 03:41	1
Ethylbenzene	ND		0.50		ug/L			08/22/12 03:41	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			08/22/12 03:41	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			08/22/12 03:41	1
m,p-Xylene	ND		1.0		ug/L			08/22/12 03:41	1
Methyl-t-Butyl Ether (MTBE)	ND		0.50		ug/L			08/22/12 03:41	1
o-Xylene	ND		0.50		ug/L			08/22/12 03:41	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			08/22/12 03:41	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			08/22/12 03:41	1
Toluene	ND		0.50		ug/L			08/22/12 03:41	1
Xylenes, Total	ND		1.0		ug/L			08/22/12 03:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*		*08/22/12 03:41*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*		*08/22/12 03:41*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*08/22/12 03:41*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	**490**		50		ug/L			08/18/12 11:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*145*	*LH*	*65 - 140*		*08/18/12 11:29*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC) Low Level

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C28)	**220**		48		ug/L		08/22/12 08:24	08/22/12 14:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*75*		*45 - 120*	*08/22/12 08:24*	*08/22/12 14:30*	*1*

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0472, Oakland

TestAmerica Job ID: 440-20673-1

Client Sample ID: MW-2
Date Collected: 08/15/12 10:30
Date Received: 08/16/12 09:45

Lab Sample ID: 440-20673-2
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50	ug/L			08/22/12 04:08	1
1,2-Dichloroethane	ND		0.50	ug/L			08/22/12 04:08	1
Benzene	ND		0.50	ug/L			08/22/12 04:08	1
Ethanol	ND		150	ug/L			08/22/12 04:08	1
Ethylbenzene	ND		0.50	ug/L			08/22/12 04:08	1
Ethyl-t-butyl ether (ETBE)	ND		0.50	ug/L			08/22/12 04:08	1
Isopropyl Ether (DIPE)	ND		0.50	ug/L			08/22/12 04:08	1
m,p-Xylene	ND		1.0	ug/L			08/22/12 04:08	1
Methyl-t-Butyl Ether (MTBE)	ND		0.50	ug/L			08/22/12 04:08	1
o-Xylene	ND		0.50	ug/L			08/22/12 04:08	1
Tert-amyl-methyl ether (TAME)	ND		0.50	ug/L			08/22/12 04:08	1
tert-Butyl alcohol (TBA)	ND		10	ug/L			08/22/12 04:08	1
Toluene	ND		0.50	ug/L			08/22/12 04:08	1
Xylenes, Total	ND		1.0	ug/L			08/22/12 04:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*		*08/22/12 04:08*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 120*		*08/22/12 04:08*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*08/22/12 04:08*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50	ug/L			08/18/12 11:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*89*		*65 - 140*		*08/18/12 11:01*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC) Low Level

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C28)	ND		47	ug/L		08/22/12 08:24	08/22/12 19:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*90*		*45 - 120*	*08/22/12 08:24*	*08/22/12 19:56*	*1*

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0472, Oakland

TestAmerica Job ID: 440-20673-1

Client Sample ID: MW-3
Date Collected: 08/15/12 11:59
Date Received: 08/16/12 09:45

Lab Sample ID: 440-20673-3
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50	ug/L			08/23/12 15:08	1
1,2-Dichloroethane	ND		0.50	ug/L			08/23/12 15:08	1
Benzene	ND		0.50	ug/L			08/23/12 15:08	1
Ethanol	ND		150	ug/L			08/23/12 15:08	1
Ethylbenzene	ND		0.50	ug/L			08/23/12 15:08	1
Ethyl-t-butyl ether (ETBE)	ND		0.50	ug/L			08/23/12 15:08	1
Isopropyl Ether (DIPE)	ND		0.50	ug/L			08/23/12 15:08	1
m,p-Xylene	ND		1.0	ug/L			08/23/12 15:08	1
Methyl-t-Butyl Ether (MTBE)	ND		0.50	ug/L			08/23/12 15:08	1
o-Xylene	ND		0.50	ug/L			08/23/12 15:08	1
Tert-amyl-methyl ether (TAME)	ND		0.50	ug/L			08/23/12 15:08	1
tert-Butyl alcohol (TBA)	ND		10	ug/L			08/23/12 15:08	1
Toluene	ND		0.50	ug/L			08/23/12 15:08	1
Xylenes, Total	ND		1.0	ug/L			08/23/12 15:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*08/23/12 15:08*	*1*
Dibromofluoromethane (Surr)	*91*		*80 - 120*		*08/23/12 15:08*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*08/23/12 15:08*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50	ug/L			08/18/12 10:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*79*		*65 - 140*		*08/18/12 10:34*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC) Low Level

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C28)	**600**		48	ug/L		08/22/12 08:24	08/22/12 20:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*96*		*45 - 120*	*08/22/12 08:24*	*08/22/12 20:16*	*1*

Lab Chronicle

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0472, Oakland

TestAmerica Job ID: 440-20673-1

Client Sample ID: MW-1

Lab Sample ID: 440-20673-1

Date Collected: 08/15/12 11:15

Matrix: Water

Date Received: 08/16/12 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	46911	08/22/12 03:41	YK	TAL IRV
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	46220	08/18/12 11:29	PH	TAL IRV
Total/NA	Prep	3510C			1050 mL	1 mL	47011	08/22/12 08:24	KW	TAL IRV
Total/NA	Analysis	8015B		1			47075	08/22/12 14:30	JR	TAL IRV

Client Sample ID: MW-2

Lab Sample ID: 440-20673-2

Date Collected: 08/15/12 10:30

Matrix: Water

Date Received: 08/16/12 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	46911	08/22/12 04:08	YK	TAL IRV
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	46220	08/18/12 11:01	PH	TAL IRV
Total/NA	Prep	3510C			1060 mL	1 mL	47011	08/22/12 08:24	KW	TAL IRV
Total/NA	Analysis	8015B		1			47074	08/22/12 19:56	JR	TAL IRV

Client Sample ID: MW-3

Lab Sample ID: 440-20673-3

Date Collected: 08/15/12 11:59

Matrix: Water

Date Received: 08/16/12 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	47278	08/23/12 15:08	CP	TAL IRV
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	46220	08/18/12 10:34	PH	TAL IRV
Total/NA	Prep	3510C			1050 mL	1 mL	47011	08/22/12 08:24	KW	TAL IRV
Total/NA	Analysis	8015B		1			47074	08/22/12 20:16	JR	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-46911/3
Matrix: Water
Analysis Batch: 46911

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			08/21/12 22:30	1
1,2-Dichloroethane	ND		0.50		ug/L			08/21/12 22:30	1
Benzene	ND		0.50		ug/L			08/21/12 22:30	1
Ethanol	ND		150		ug/L			08/21/12 22:30	1
Ethylbenzene	ND		0.50		ug/L			08/21/12 22:30	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			08/21/12 22:30	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			08/21/12 22:30	1
m,p-Xylene	ND		1.0		ug/L			08/21/12 22:30	1
Methyl-t-Butyl Ether (MTBE)	ND		0.50		ug/L			08/21/12 22:30	1
o-Xylene	ND		0.50		ug/L			08/21/12 22:30	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			08/21/12 22:30	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			08/21/12 22:30	1
Toluene	ND		0.50		ug/L			08/21/12 22:30	1
Xylenes, Total	ND		1.0		ug/L			08/21/12 22:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*08/21/12 22:30*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*		*08/21/12 22:30*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*08/21/12 22:30*	*1*

Lab Sample ID: LCS 440-46911/4
Matrix: Water
Analysis Batch: 46911

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2-Dibromoethane (EDB)			25.0	26.4		ug/L		106	75 - 125		
1,2-Dichloroethane			25.0	27.0		ug/L		108	60 - 140		
Benzene			25.0	22.7		ug/L		91	70 - 120		
Ethanol			250	186		ug/L		74	40 - 155		
Ethylbenzene			25.0	26.7		ug/L		107	75 - 125		
Ethyl-t-butyl ether (ETBE)			25.0	24.3		ug/L		97	65 - 135		
Isopropyl Ether (DIPE)			25.0	21.7		ug/L		87	60 - 135		
m,p-Xylene			50.0	51.5		ug/L		103	75 - 125		
Methyl-t-Butyl Ether (MTBE)			25.0	24.8		ug/L		99	60 - 135		
o-Xylene			25.0	26.8		ug/L		107	75 - 125		
Tert-amyl-methyl ether (TAME)			25.0	24.2		ug/L		97	60 - 135		
tert-Butyl alcohol (TBA)			125	128		ug/L		103	70 - 135		
Toluene			25.0	24.4		ug/L		97	70 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*105*		*80 - 120*
Toluene-d8 (Surr)	*99*		*80 - 120*

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-20826-A-2 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 46911

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromoethane (EDB)	ND		25.0	28.2		ug/L		113	70 - 130
1,2-Dichloroethane	ND		25.0	27.2		ug/L		109	60 - 140
Benzene	ND		25.0	23.0		ug/L		92	65 - 125
Ethanol	ND		250	191		ug/L		76	40 - 155
Ethylbenzene	ND		25.0	27.7		ug/L		111	65 - 130
Ethyl-t-butyl ether (ETBE)	ND		25.0	23.5		ug/L		94	60 - 135
Isopropyl Ether (DIPE)	ND		25.0	20.4		ug/L		82	60 - 140
m,p-Xylene	ND		50.0	53.7		ug/L		107	65 - 130
Methyl-t-Butyl Ether (MTBE)	340	EY	25.0	362	EY BB	ug/L		99	55 - 145
o-Xylene	ND		25.0	27.1		ug/L		108	65 - 125
Tert-amyl-methyl ether (TAME)	1.9		25.0	25.5		ug/L		94	60 - 140
tert-Butyl alcohol (TBA)	130		125	262		ug/L		105	65 - 140
Toluene	ND		25.0	25.0		ug/L		100	70 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*99*		*80 - 120*

Lab Sample ID: 440-20826-A-2 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 46911

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dibromoethane (EDB)	ND		25.0	25.8		ug/L		103	70 - 130	9	25
1,2-Dichloroethane	ND		25.0	28.2		ug/L		113	60 - 140	3	20
Benzene	ND		25.0	21.7		ug/L		87	65 - 125	6	20
Ethanol	ND		250	174		ug/L		69	40 - 155	9	30
Ethylbenzene	ND		25.0	25.5		ug/L		102	65 - 130	8	20
Ethyl-t-butyl ether (ETBE)	ND		25.0	22.3		ug/L		89	60 - 135	5	25
Isopropyl Ether (DIPE)	ND		25.0	19.7		ug/L		79	60 - 140	3	25
m,p-Xylene	ND		50.0	49.1		ug/L		98	65 - 130	9	25
Methyl-t-Butyl Ether (MTBE)	340	EY	25.0	371	EY BB	ug/L		137	55 - 145	3	25
o-Xylene	ND		25.0	25.2		ug/L		101	65 - 125	7	20
Tert-amyl-methyl ether (TAME)	1.9		25.0	26.1		ug/L		97	60 - 140	2	30
tert-Butyl alcohol (TBA)	130		125	257		ug/L		102	65 - 140	2	25
Toluene	ND		25.0	23.4		ug/L		94	70 - 125	7	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 120*
Toluene-d8 (Surr)	*100*		*80 - 120*

Lab Sample ID: MB 440-47278/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 47278

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			08/23/12 08:29	1

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 440-47278/4
Matrix: Water
Analysis Batch: 47278

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND		0.50		ug/L			08/23/12 08:29	1
Benzene	ND		0.50		ug/L			08/23/12 08:29	1
Ethanol	ND		150		ug/L			08/23/12 08:29	1
Ethylbenzene	ND		0.50		ug/L			08/23/12 08:29	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			08/23/12 08:29	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			08/23/12 08:29	1
m,p-Xylene	ND		1.0		ug/L			08/23/12 08:29	1
Methyl-t-Butyl Ether (MTBE)	ND		0.50		ug/L			08/23/12 08:29	1
o-Xylene	ND		0.50		ug/L			08/23/12 08:29	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			08/23/12 08:29	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			08/23/12 08:29	1
Toluene	ND		0.50		ug/L			08/23/12 08:29	1
Xylenes, Total	ND		1.0		ug/L			08/23/12 08:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*08/23/12 08:29*	*1*
Dibromofluoromethane (Surr)	*91*		*80 - 120*		*08/23/12 08:29*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*08/23/12 08:29*	*1*

Lab Sample ID: LCS 440-47278/5
Matrix: Water
Analysis Batch: 47278

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromoethane (EDB)	25.0	23.9		ug/L		96	75 - 125
1,2-Dichloroethane	25.0	21.7		ug/L		87	60 - 140
Benzene	25.0	25.5		ug/L		102	70 - 120
Ethanol	250	228		ug/L		91	40 - 155
Ethylbenzene	25.0	25.7		ug/L		103	75 - 125
Ethyl-t-butyl ether (ETBE)	25.0	23.4		ug/L		94	65 - 135
Isopropyl Ether (DIPE)	25.0	24.2		ug/L		97	60 - 135
m,p-Xylene	50.0	51.9		ug/L		104	75 - 125
Methyl-t-Butyl Ether (MTBE)	25.0	23.5		ug/L		94	60 - 135
o-Xylene	25.0	26.2		ug/L		105	75 - 125
Tert-amyl-methyl ether (TAME)	25.0	25.2		ug/L		101	60 - 135
tert-Butyl alcohol (TBA)	125	131		ug/L		105	70 - 135
Toluene	25.0	24.8		ug/L		99	70 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*
Dibromofluoromethane (Surr)	*95*		*80 - 120*
Toluene-d8 (Surr)	*98*		*80 - 120*

Lab Sample ID: 440-21032-D-11 MS
Matrix: Water
Analysis Batch: 47278

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromoethane (EDB)	ND		25.0	24.1		ug/L		96	70 - 130

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-21032-D-11 MS
Matrix: Water
Analysis Batch: 47278

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethane	ND		25.0	22.9		ug/L		92	60 - 140
Benzene	4.2		25.0	28.6		ug/L		98	65 - 125
Ethanol	ND		250	231		ug/L		92	40 - 155
Ethylbenzene	1.6		25.0	26.8		ug/L		101	65 - 130
Ethyl-t-butyl ether (ETBE)	ND		25.0	23.4		ug/L		94	60 - 135
Isopropyl Ether (DIPE)	ND		25.0	23.8		ug/L		95	60 - 140
m,p-Xylene	1.5		50.0	52.3		ug/L		102	65 - 130
Methyl-t-Butyl Ether (MTBE)	ND		25.0	23.8		ug/L		95	55 - 145
o-Xylene	ND		25.0	25.9		ug/L		104	65 - 125
Tert-amyl-methyl ether (TAME)	ND		25.0	25.3		ug/L		101	60 - 140
tert-Butyl alcohol (TBA)	ND		125	131		ug/L		105	65 - 140
Toluene	ND		25.0	25.0		ug/L		99	70 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*
Dibromofluoromethane (Surr)	*93*		*80 - 120*
Toluene-d8 (Surr)	*99*		*80 - 120*

Lab Sample ID: 440-21032-D-11 MSD
Matrix: Water
Analysis Batch: 47278

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dibromoethane (EDB)	ND		25.0	24.4		ug/L		98	70 - 130	1	25
1,2-Dichloroethane	ND		25.0	22.9		ug/L		92	60 - 140	0	20
Benzene	4.2		25.0	28.6		ug/L		97	65 - 125	0	20
Ethanol	ND		250	251		ug/L		100	40 - 155	8	30
Ethylbenzene	1.6		25.0	27.0		ug/L		102	65 - 130	1	20
Ethyl-t-butyl ether (ETBE)	ND		25.0	23.8		ug/L		95	60 - 135	2	25
Isopropyl Ether (DIPE)	ND		25.0	24.1		ug/L		96	60 - 140	1	25
m,p-Xylene	1.5		50.0	52.9		ug/L		103	65 - 130	1	25
Methyl-t-Butyl Ether (MTBE)	ND		25.0	24.7		ug/L		99	55 - 145	3	25
o-Xylene	ND		25.0	26.5		ug/L		106	65 - 125	2	20
Tert-amyl-methyl ether (TAME)	ND		25.0	25.5		ug/L		102	60 - 140	1	30
tert-Butyl alcohol (TBA)	ND		125	131		ug/L		105	65 - 140	0	25
Toluene	ND		25.0	25.4		ug/L		100	70 - 125	1	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*
Dibromofluoromethane (Surr)	*94*		*80 - 120*
Toluene-d8 (Surr)	*98*		*80 - 120*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Lab Sample ID: MB 440-46220/23
Matrix: Water
Analysis Batch: 46220

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50		ug/L			08/18/12 03:36	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*87*		*65 - 140*		*08/18/12 03:36*	*1*

Lab Sample ID: LCS 440-46220/22
Matrix: Water
Analysis Batch: 46220

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
GRO (C4-C12)			800	766		ug/L		96	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*120*		*65 - 140*

Lab Sample ID: 440-20228-B-1 MS
Matrix: Water
Analysis Batch: 46220

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
GRO (C4-C12)	ND		800	739		ug/L		87	65 - 140		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*128*		*65 - 140*

Lab Sample ID: 440-20228-B-1 MSD
Matrix: Water
Analysis Batch: 46220

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
GRO (C4-C12)	ND		800	706		ug/L		83	65 - 140	5	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*128*		*65 - 140*

Method: 8015B - Diesel Range Organics (DRO) (GC) Low Level

Lab Sample ID: MB 440-47011/1-A
Matrix: Water
Analysis Batch: 47074

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 47011

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C28)	ND		50		ug/L		08/22/12 08:24	08/22/12 13:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*88*		*45 - 120*	*08/22/12 08:24*	*08/22/12 13:30*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC) Low Level (Continued)

Lab Sample ID: LCS 440-47011/2-A
Matrix: Water
Analysis Batch: 47074

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 47011

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
DRO (C10-C28)			1000	750		ug/L		75	40 - 115		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
n-Octacosane	*87*		*45 - 120*

Lab Sample ID: LCSD 440-47011/3-A
Matrix: Water
Analysis Batch: 47074

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 47011

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
DRO (C10-C28)			1000	782		ug/L		78	40 - 115	4	25

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
n-Octacosane	*89*		*45 - 120*

QC Association Summary

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0472, Oakland

TestAmerica Job ID: 440-20673-1

GC/MS VOA

Analysis Batch: 46911

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-20673-1	MW-1	Total/NA	Water	8260B/5030B	
440-20673-2	MW-2	Total/NA	Water	8260B/5030B	
440-20826-A-2 MS	Matrix Spike	Total/NA	Water	8260B/5030B	
440-20826-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B/5030B	
LCS 440-46911/4	Lab Control Sample	Total/NA	Water	8260B/5030B	
MB 440-46911/3	Method Blank	Total/NA	Water	8260B/5030B	

Analysis Batch: 47278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-20673-3	MW-3	Total/NA	Water	8260B/5030B	
440-21032-D-11 MS	Matrix Spike	Total/NA	Water	8260B/5030B	
440-21032-D-11 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B/5030B	
LCS 440-47278/5	Lab Control Sample	Total/NA	Water	8260B/5030B	
MB 440-47278/4	Method Blank	Total/NA	Water	8260B/5030B	

GC VOA

Analysis Batch: 46220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-20228-B-1 MS	Matrix Spike	Total/NA	Water	8015B/5030B	
440-20228-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8015B/5030B	
440-20673-1	MW-1	Total/NA	Water	8015B/5030B	
440-20673-2	MW-2	Total/NA	Water	8015B/5030B	
440-20673-3	MW-3	Total/NA	Water	8015B/5030B	
LCS 440-46220/22	Lab Control Sample	Total/NA	Water	8015B/5030B	
MB 440-46220/23	Method Blank	Total/NA	Water	8015B/5030B	

GC Semi VOA

Prep Batch: 47011

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-20673-1	MW-1	Total/NA	Water	3510C	
440-20673-2	MW-2	Total/NA	Water	3510C	
440-20673-3	MW-3	Total/NA	Water	3510C	
LCS 440-47011/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 440-47011/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	
MB 440-47011/1-A	Method Blank	Total/NA	Water	3510C	

Analysis Batch: 47074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-20673-2	MW-2	Total/NA	Water	8015B	47011
440-20673-3	MW-3	Total/NA	Water	8015B	47011
LCS 440-47011/2-A	Lab Control Sample	Total/NA	Water	8015B	47011
LCSD 440-47011/3-A	Lab Control Sample Dup	Total/NA	Water	8015B	47011
MB 440-47011/1-A	Method Blank	Total/NA	Water	8015B	47011

Analysis Batch: 47075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-20673-1	MW-1	Total/NA	Water	8015B	47011

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
BB	Sample > 4X spike concentration
EY	Result exceeds normal dynamic range; reported as a min. est.

GC VOA

Qualifier	Qualifier Description
LH	Surrogate Recoveries were higher than QC limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0472, Oakland

TestAmerica Job ID: 440-20673-1

Laboratory: TestAmerica Irvine

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arizona	State Program	9	AZ0671	10-13-12
California	LA Cty Sanitation Districts	9	10256	01-31-13
California	NELAC	9	1108CA	01-31-13
California	State Program	9	2706	06-30-14
Guam	State Program	9	Cert. No. 12.002r	01-23-13
Hawaii	State Program	9	N/A	01-31-13
Nevada	State Program	9	CA015312007A	07-31-12
New Mexico	State Program	6	N/A	01-31-12
Northern Mariana Islands	State Program	9	MP0002	01-31-13
Oregon	NELAC	10	4005	09-12-12
USDA	Federal		P330-09-00080	06-06-14

440-20673

Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP 472 **Req Due Date (mm/dd/yy):** ____ **Rush TAT:** Yes ____ No ____

BP Facility No: 472 **Lab Work Order Number:** ____

Lab Name: Test America	Facility Address: 6415 International Blvd	Consultant/Contractor: Broadbent & Associates Inc.
Lab Address: 17461 Derian Avenue, Suite 100, Irvine, CA	City, State, ZIP Code: Oakland, CA	Consultant/Contractor Project No: 09-88-601
Lab PM: Pat Abe	Lead Regulatory Agency: ACEH	Address: 1324 Mangrove Ave., Suite 212, Chico, California
Lab Phone: 949-261-1022	California Global ID No.: T10000000417	Consultant/Contractor PM: Tom Venus
Lab Shipping Accnt: Fed ex#: 11103-6633-7	Enfos Proposal No/ WR#: 005XP-0002 / WR245684	Phone: 530-566-1400 / 530-566-1401 (f) Email: tvenus@broadbentinc.com
Lab Bottle Order No: 0114301X / 0210401X	Accounting Mode: Provision X OOC-BU ____ OOC-RM ____	Email EDD To: tvenus@broadbentinc.com and to lab.enfosdoc@bp.com
Other Info:	Stage: Execute (40) Activity: Project Spend (80)	Invoice To: BP x Contractor ____
BP Project Manager (PM): Shannon Couch		
BP PM Phone: 925-275-3804		
BP PM Email: shannon.couch@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix: Is this location a well?	No. Containers / Preservative: Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Requested Analyses: GRO and DRO by 8015M	BTEX/5 FO +EDB	1,2-DCA and Ethanol by 8260							Report Type & QC Level: Comments
	MW-1	8/15/12	1115		x		y	8	x			x			x	x	x							
	MW-2		1030		x		y	8	x			x			x	x	x							1 (1L Amber) was broken
	MW-3		1159		x		y	8	x			x			x	x	x							
	TB -472- 08152012	↓	—		x			2				x												ON HOLD

Standard ____

Full Data Package ____

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: Alex Martinez	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Broadbent & Associates	[signature] / Broadbent	8/15/12	1630	VanBaalk TAL	8/16/12	9:45
Shipment Method: Fed Ex Ship Date: 8/15/12						
Shipment Tracking No: 8005 - 8150 2679						

Special Instructions: Keep results separate from 11104 site

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 5.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Login Sample Receipt Checklist

Client: Broadbent & Associates, Inc.

Job Number: 440-20673-1

Login Number: 20673

List Source: TestAmerica Irvine

List Number: 1

Creator: Freitag, Kevin R

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	Alex Martinez
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	False	Containers recd broken. Sufficient sample in remaining containers for analysis.
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX D

GEOTRACKER UPLOAD CONFIRMATION RECEIPTS

STATE WATER RESOURCES CONTROL BOARD

GEOTRACKER ESI

UPLOADING A GEO_WELL FILE

SUCCESS

Processing is complete. No errors were found!
Your file has been successfully submitted!

Submittal Type:	**GEO_WELL**
Report Title:	**3Q12 GEO_WELL 472**
Facility Global ID:	**T10000000417**
Facility Name:	**ARCO # / PLUCKY LIQUORS**
File Name:	**GEO_WELL.zip**
Organization Name:	**Broadbent & Associates, Inc.**
Username:	**BROADBENT-C**
IP Address:	**67.118.40.90**
Submittal Date/Time:	**9/12/2012 9:52:42 AM**
Confirmation Number:	**8744232118**

STATE WATER RESOURCES CONTROL BOARD

GEOTRACKER ESI

UPLOADING A EDF FILE

SUCCESS

Processing is complete. No errors were found!
Your file has been successfully submitted!

Submittal Type:	**EDF**
Report Title:	**3Q12 GW Monitoring**
Report Type:	**Monitoring Report - Semi-Annually**
Facility Global ID:	**T10000000417**
Facility Name:	**ARCO # / PLUCKY LIQUORS**
File Name:	**440-20673-1_30 Aug 12 2027_EDF.zip**
Organization Name:	**Broadbent & Associates, Inc.**
Username:	**BROADBENT-C**
IP Address:	**67.118.40.90**
Submittal Date/Time:	**9/12/2012 9:51:06 AM**
Confirmation Number:	**6238662660**

VIEW QC REPORT

VIEW DETECTIONS REPORT